

English

Original instructions



SERVICE MANUAL FOR TRAVELING INVERTER

Service Manual for DMCS 007F

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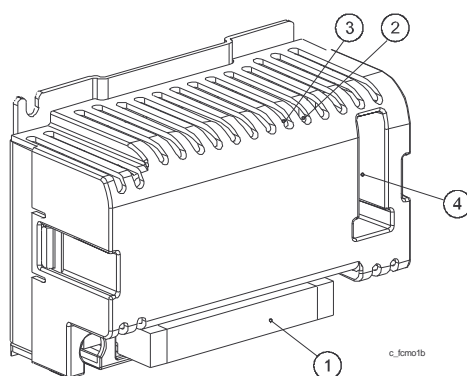
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1 DESCRIPTION OF THE INVERTER



There are high voltages inside the inverter (including the programming switches). Wait for at least three minutes after the supply voltage has been switched off before any service actions.

DMCS007



1. Terminal X1
2. Red led (fault)
3. Green led (ok)
4. Programming switches

1.1 Connections

All connections are made to terminal block X1 as follows:



Crane power supply conductor rail must have double collectors.

DMCS007		
Nbr	Name	Description
1	PE	Protective earth.
2	L1	Mains, phase 1. 380-480V 50/60Hz.
3	L2	Mains, phase 2. 380-480V 50/60Hz.
4	L3	Mains, phase 3. 380-480V 50/60Hz.
5	U	Motor, phase 1.
6	V	Motor, phase 2.
7	W	Motor, phase 3.
8	S1	Drive command. Direction 1. 48 or 115V 50/60Hz
9	S2	Drive command. Direction 2. 48 or 115V 50/60Hz
10	SP2/AP	Speed 2 / Acceleration command. 48 or 115V 50/60Hz
11	ON	Control voltage, neutral.



Standard duty resistor must be disconnected when heavy duty resistor DMHR01F90 is connected to terminals R+ and R-.

1.2 Technical characteristics

Technical data	DMCS007
Power range	0.75kW
Supply voltage	380 - 480 VAC -10%/+5%
Nominal supply frequency	48 – 62 Hz
Nominal current	2.4A
Digital control	S1, S2, DI3
Max output voltage	Equal to supply voltage
Control voltage range	48 VAC/115 +/- 10%. If control voltage is 230VAC, front resistors (15k,2W) have to be connected to digital inputs
Output	
Ambient temperature	-10°C to 50°C

Technical data	DMCS007
Humidity	95% N.C. (without dripping)
Degree of protection	Frequency converter + cover (IP20)
Dimensions (WxHxD)	133x92x60mm
Altitude	Output current must be reduced 1 % for every 100 m over 1000 m. For altitudes over 3000 m, manufacturer must be consulted.
Pollution degree	Pollution degree 2 according to NEMA ICS-1, IEC664 and UL840
Vibration	IEC68-2-6
Shock	IEC68-2-27

1.3 Normal operation

The inverter goes into the ready-to-run state within one second after the power supply is connected. During running the inverter follows the operator's speed reference according to the set acceleration/deceleration ramp. During direction change the brake is kept open all the time. When drive command is switched off the inverter decelerates to zero according to the set ramp and closes the mechanical brake.

1.4 Status indication leds (green and red)

The inverter indicates its operating state by two leds. Red led indicates "fault state" (driving is inhibited). Green led indicates "ok-state". Blinking of green led indicates that fault state has been active, but it has been recovered. Normal driving is however possible also when green led is blinking (in other words, blinking of green led does not indicate "warning-state").

1.5 Compact brake motors

This inverter is used with Compact brake motors, which have been especially designed for this use. The Compact brake motors have the following special features:

- Compact brake, which is opened by the magnetic force of the motor. When the magnetic force is removed (by cutting off the motor current) the brake is closed by spring force.
- High nominal frequency (80Hz...120Hz)

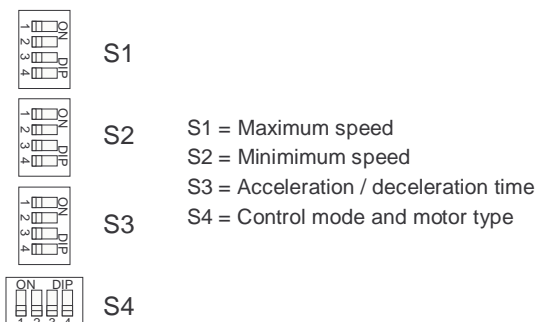
1.6 Programming switches



WARNING!!! There are high voltages inside the inverter (including the programming switches). Wait for at least three minutes after the supply voltage has been switched off before any service actions.

The programming of the inverter is performed by dip-switches. The state of each switch is either OFF (0) or ON (1). There are five parameters that are possible to set by the switches S1-S4.

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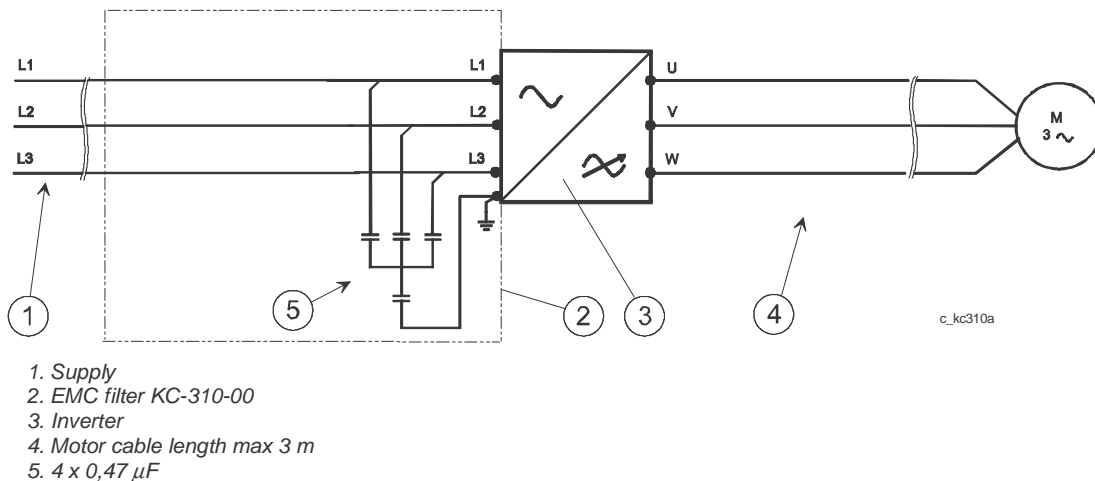


1.7 The EMC requirements

The device complies with the requirements of EN61800-3:2004 (IEC61800-3) for second environment, category C3, when a dedicated external EMC filter is applied.

1.7.1 EMC filter connection to inverter for trolley travelling.

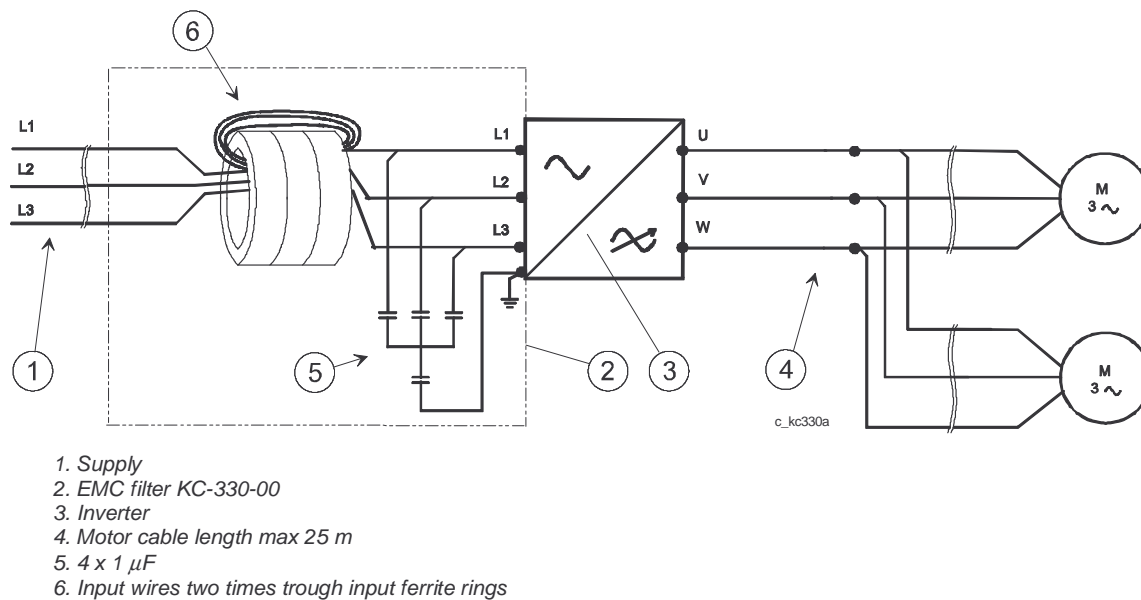
DMCS007



Capacitors have to be placed as near the inverter as possible.

1.7.2 EMC filter connection to inverter for bridge travelling.

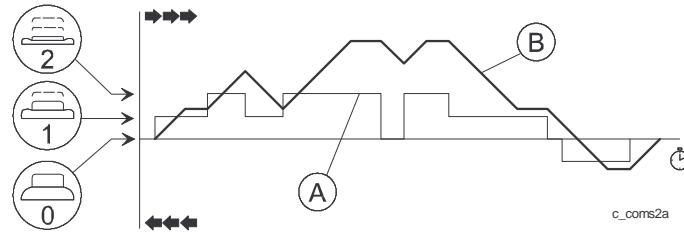
DMCS007



Capacitors have to be placed as near the inverter as possible.

2 DESCRIPTION OF CONTROL MODES

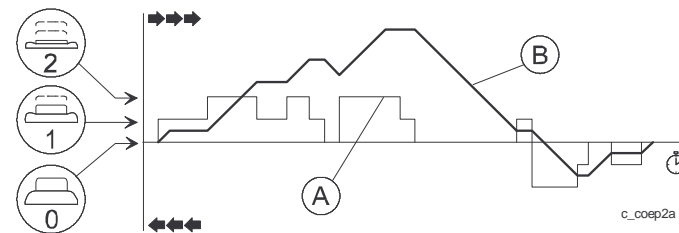
2.1 MS2-control (S4-1=OFF)



A. Push button position
B. Speed

- S1 means "drive minimum speed forward"
- S2 means "drive minimum speed reverse"
- SP2 means "maximum speed"
- When S1 and S2 or are not active the inverter decelerates to zero

2.2 EP2-control (S4-1=ON)



A. Push button position
B. Speed
0. Decelerate
1. Maintain speed
2. Accelerate









- S1 means "drive forward"
- S2 means "drive reverse"
- AP means "acceleration"
- When starting S1 and S2 mean "accelerate to minimum speed"
- When S1 and S2 are not active the inverter decelerates to zero
- During running S1 and S2 mean "hold speed"
- At maximum speed AP means "hold speed"

3 FAULT CODES, TROUBLESHOOTING



There are high voltages inside the inverter (including the programming switches). Wait for at least three minutes after the supply voltage has been switched off before any service actions.

When the inverter detects a fault situation it stops running and starts signalling the fault code by blinking the indication leds (green and red). The blinking of the code is carried on until a new fault occurs or until power is switched off. The fault codes are explained in the table below.

Fault code, color		Fault. Possible cause. Checkings.
		DMCS007
GREEN		Overvoltage. Mains voltage is too high or ramp time is too short. Check the voltage of all supply phases at the terminal X1. If they are ok then set a longer ramp by switch S3.
		
GREEN		Stall supervision / overcurrent. Brake does not open properly or there is an obstacle on the track. Check also that the setting of switch S4 is made according to the supplied motor(s).
GREEN		Deceleration ramp supervision. Deceleration ramp has not been followed. If the fault occurs again set longer ramp time by switch S3. Check also the voltage of all supply phases at the terminal X1.
GREEN		Inverter overtemperature. Motor current is too high (bearing problem, obstacle on the track, brake does not open properly,...) or the ambient temperature is too high.
GREEN		Undervoltage. Check the voltage of all supply phases at the terminal X1.
RED		Short circuit. Switch the power off. Check the insulation of the motor cables and the motor windings.
RED		Microprocessor fault. Switch the power off for 10 seconds. Then power-up the inverter.



The latest active fault is removed from the memory always when power is switched off.



If inverter is not in a fault state, but driving is not possible:

- Motor will not start if dc-bus voltage too high (above 745V), this occurs if any of line-to-line voltages exceeds $480V + 5\% = 508V$
 - *If line voltage cannot be reduced, install drop-down transformer*
- Check the supply voltage phases at terminal X1.
- Check the control signals at terminal X1.
- Check that the control voltage level is correct. Rating plate is located on the left side of the inverter.
- Check all parameters, especially the motor parameters (switch S4).
- Check that the motor(s) corresponds the selected motor parameters.
- Check that the microprocessor starts running. Both indication leds (green and red) blink once as the inverter is powered up. After the one second initialising-time only the green led should be light.
- Check that the brake opens and closes properly. Check the brake airgap if necessary.

4 PROGRAMMING OF THE APPLICATION PARAMETERS

4.1 Minimum speed, maximum speed and ramp time

The adjustment ranges of maximum and minimum speed depend on the selected motor type (i.e. motor nominal frequency). The speeds in the speed table A are used for the 100/120Hz motors and the speeds in the speed table B for the 80Hz motors and in the speed table D for the 35Hz motors. The maximum speed and minimum speed and ramp time are set as follows:

Switch S1 / S2				SPEEDTABLE A (100/120Hz motors)		SPEEDTABLE B (80Hz motors)		SPEEDTABLE D (35Hz motors)	
-1	-2	-3	-4	Max speed (Hz)	Min speed (Hz)	Max speed (Hz)	Min speed (Hz)	Max speed (Hz)	Min speed (Hz)
0	0	0	1	50	14	42	14	19	9
0	0	1	1	54	10	40	10	20	4
0	1	0	1	58	12	44	12	21	5
0	0	1	0	62	23	50	18	22	13
0	1	1	0	66	16	46	16	23	6
0	1	1	1	70	18	48	20	25	7
1	0	0	1	75	20	53	24	26	10
0	1	0	0	80	32	62	30	28	15
1	0	1	0	85	26	56	26	30	11
1	0	1	1	90	35	59	28	32	12
1	1	0	0	95	38	65	32	33	14
0	0	0	0	100	29	77	22	35	8
1	1	0	1	105 ¹⁾	41	68	34	37	16
1	1	1	0	110 ¹⁾	44	71	36	39	17
1	0	0	0	115 ¹⁾	50	80	40	41	19
1	1	1	1	120 ¹⁾	47	74	38	42	18

1) Speeds above 100Hz are only available when the inverter is connected in 440-480V mains.

EXAMPLE OF PARAMETER SETTING:

80Hz motor is connected to the inverter and 62Hz maximum speed is desired. That speed is located on the 5th row in the speedtable B. The corresponding setting for S1 switches is in the same row in the leftmost columns of the table: 0-1-0-0 (off-on-off-off).



Max speed set to 62Hz.

4.1.1 Acceleration and deceleration ramp

The acceleration and deceleration ramps are set by switch S3 as follows:

Switch S3				Acceleration/deceleration ramp time
-1	-2	-3	-4	
1	0	0	0	1.5 sec
0	1	0	0	2.0 sec
0	0	0	0	2.5 sec
0	0	1	0	3.0 sec
0	0	0	1	3.5 sec
1	0	0	1	4.0 sec
1	1	0	0	4.5 sec
0	0	1	1	5.0 sec
1	1	1	0	5.5 sec
1	1	0	1	6.0 sec
1	0	1	1	6.5 sec
1	0	1	0	7.0 sec
0	1	1	1	7.5 sec



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Switch S3				Acceleration/deceleration ramp time
-1	-2	-3	-4	
0	1	0	1	8.0 sec

4.2 Selection of the motor type

The motor type is selected by switches S4-2, S4-3 and S4-4. There are several motor dependant parameters which are set according to the selected motor (i.e. the operator selects a parameter set). The MF06-motors are selected as follows:

S4			Motor type	Nominal frequency	Nominal power
-2	-3	-4			
0	0	0	MF06MA200	100Hz (120Hz)	0.3kW (0.37kW)
1	0	0	MF06MA100	80Hz	0.65kW
0	1	0	MF06LA200	100Hz (120Hz)	0.45kW (0.55kW)
1	1	0	MF06LA100	80Hz	0.65kW
0	0	1	2*MF06MA200	100Hz (120Hz)	2*0.3kW (2*0.37kW)
1	0	1	MF06L-200	35 Hz	0.15kW